

SOCIETY OF ST. FRANCIS XAVIER, PILAR'S  
**FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING**

(Approved by AICTE & Affiliated to University of Mumbai)

**Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai - 400 050.**

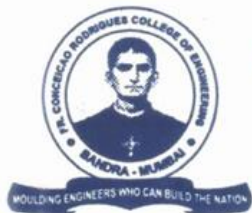
Phone : (022) 6711 4000, 6711 4101, 6711 4104

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# Computer Engineering

## (Academic Year: 2023-2024)

<b>Course Code: HBCC701</b>	
<b>Course Name: Blockchain Development (Honour Course)</b>	
<b>Course Teacher: Mrs. Monali Shetty</b>	
<b>Course Outcomes (CO): <i>At the End of the course students will be able to</i></b>	
HBCC701.1	Create smart contract application using Ethereum components.
HBCC701.2.	Demonstrate different blockchain programming languages.
HBCC701.3	Develop Smart Contract in Ethereum using Solidity language
HBCC701.4.	Analyze different blockchain development frameworks.
HBCC701.5	Develop private blockchain network with Hyperledger fabric or Geth.
HBCC701.6:	Assess the incorporation of blockchain with emerging technologies



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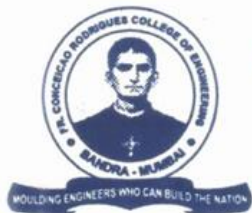
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## Course Lesson Plan

Sr. No.	Proposed Date	Actual Date	Topics	CO	Teacher's Remark	HoD's Remark	
1	11-07-23		<b>M-1 Ethereum Ecosystem</b> - Subject overview, Advanced Project Discussion. Ethereum components Miner, mining node, Ethereum Virtual Machine Ether, Gas, Transactions, Accounts	CO1			
2	12-07-23			CO1			
3	13-07-23			CO1			
4	14-07-23		Assignment discussion and implementation on Gas price, gas cost by using different memory management techniques	CO1	Assignment Discussion		
5	18-07-23		Assignment discussion on array in solidity	CO3			
6	19-07-23		Swarm	CO1			
7	20-07-23		Whisper, Ethash	CO1			
8	21-07-23		Ethash, end to end transaction in Ethereum, Architecture of Ethereum	CO1			
9	25-07-23		Assignment on role based access control , modifiers in solidity	CO3			
10	26-07-23		<b>M-2 Blockchain Programming</b> -Types of Blockchain Programming, Overview of Solidity , GoLang, Vyper, Java , Simplicity, Rholang	CO2			
11	27-07-23			GoLang, Comparison with Solidity	CO2		
12	28-07-23			Assignment on critical function in smart contract using modifiers	CO2		
13	01-08-23		Program on GoLang, Vyper , Comparison with Solidity	CO2			
14	02-08-23		Program on Vyper, Java, Comparison with Solidity	CO2			
15	03-08-23		<b>M-3 Smart Contract</b> - Solidity Programming, Remix, How to compile and deploy smart contract on Remix	CO3			
16	04-08-23			Fungible and non-fungible tokens	CO3		
17	08-08-23		ERC 20 and ERC 721 tokens intro	CO3			
18	09-08-23		Assignment discussion on fallback function	CO3			
19	10-08-23		Detail discussion on ERC20 with implementation	CO3			
20	11-08-23		Create and deploy ERC 20 using standard functions and (using openzeppelin )	CO3	Assignment 1		
	15-08-23		<b>Independence Day</b>				



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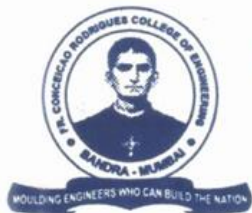
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	16-08-23		<b>Parsi New Year</b>			
21	17-08-23		Detail discussion on ERC721 with implementation	CO3		
22	18-08-23		Create and deploy ERC 721(usinn Openzeplin)	CO3		
23	22-08-23		Continue (metadata)	CO3	Quiz 1 on Module 1 and 2 (21-8-23)	
24	23-08-23		Comparison between ERC20 and ERC 721	CO3		
25	24-08-23		ICO, STOMetamask	CO3		
26	25-08-23		Solidity functions, view and pure function	CO3		
	28-08-23 to 31-08-23		<b>Unit Test-1</b>			
27	31-08-23		Solidity data locations – storage, memory, calldata	CO3		
28	05-09-23		Mapper functions, Payable, fallback	CO3		
29	06-09-23		Smart contract opportunities and risks	CO3		
30	07-09-23		Uses cases of smart contract	CO3		
31	08-09-23		<b>M-2 Blockchain Programming</b> - Program on Java, Simplicity, Comparison with Solidity,	CO2		
32	12-09-23		Program on Simplicity, Rholang, Comparison with Solidity	CO2		
33	13-09-23		Game theory and cryptonomics	CO2		
34	14-09-23		Comparative study of different blockchain programming ,	CO2		
35	15-09-23		Decentralized file system- IPFS	CO2		
	19-09-23 to 22-09-23		Shri Ganesh Festival			
36	26-09-23		Ethereum client, Ethereum network, Introduction to Go Ethereum(Geth), Geth Installation and Geth CLI	CO4		
37	27-09-23		Setting up a private Ethereum blockchain, Introduction to Truffle	CO4		
	28-09-23		Anant Chaturdashi			
38	29-09-23		Introduction to Ganache. Web3js connectivity	CO4		
39	03-10-23		Dapp architecture , Dapps scalability, testing	CO4		
40	04-10-23		<b>M-5 Hyperledger Application Development</b> – Installing hyperledger fabric, ,Hyperledger fabric demo	CO5		
41	05-10-23		Hyperledger fabric network configuration, Certificate authorities	CO5		



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42	06-10-23		Chaincode development and Invocation, Deployment and testing of chaincode on development network.	CO5		
	09-10-23 to 11-10-23		<b>Unit Test-2</b>			
43	12-10-23		AI, IOT, integrating blockchain with cloud	CO6		
44	13-10-23		ERP, End to end blockchain integration	CO6		
45	16-10-23		Risk and limitations of blockchain, Privacy and security. Criminal use of payment blockchains, the dark side of blockchain	CO6	Quiz 2 on Modules 4-6	
46	17-10-23		Remedial Session			
47	18-10-23					
			<b>University ESE Examination</b>			

**Text books:**

1. Blockchain Technology, Chandramouli Subramanian, Asha A. George, Abhillash K. A and Meena Karthikeyen, Universities Press.
2. Mastering Ethereum, Building Smart Contract and Dapps, Andreas M. Antonopoulos Dr. Gavin Wood, O'reilly.
3. Imran Bashir, Mastering Blockchain: A deep dive into distributed ledgers, consensus protocols, smart contracts, DApps, cryptocurrencies, Ethereum, and more, 3rd Edition, Packt Publishing.

**Reference Books:**

1. Blockchain enabled Applications, Vikram Dhillon, Apress
2. Building Blockchain Projects, Narayan Prusty, Packt
3. Blockchain with Hyperledger Fabric, Luc Desrosiers, Nitin Gaur, Salman A. Baset, Venkatraman Ramakrishna, Packt Publishing

**Course Instructor: Monali Shetty**